CLAIMS

1. A SIM comprising:

a substrate;

an IC chip mounted on the substrate and provided with a dual interface for contact and noncontact communication;

a contact-terminal plate mounted on the substrate and provided with a plurality of contact terminals; and

a SIM base holding the substrate, the IC chip and the contact-terminal plate;

wherein antenna terminals of the IC chip are connected to the contact terminals that are not used for contact communication.

2. The SIM according to claim 1, wherein a SIM antenna coil is formed on the SIM base.

3. The SIM according to claim 1,wherein

the antenna terminals of the IC chip are connected to terminals C4 and C8 included in eight contact terminals of the SIM.

4. The SIM according to claim 1, wherein

the SIM has the shape of a thin plate having a thickness of 1.0 mm or below and a substantially rectangular shape not greater than 25 mm × 15 mm in a projection on a horizontal plane.

5. The SIM according to claim 1,

wherein one or some of a half-length photograph, a name and a number are printed on a surface of the SIM base opposite a surface of the SIM base on which the contact-terminal plate is mounted.

6. A SIM comprising:

a substrate;

an IC chip mounted on the substrate;

a contact-terminal plate provided with a plurality of contact terminals; and

a SIM base holding the substrate, the IC chip and the contact-terminal plate;

wherein the contact terminals of the contact-terminal plate include extra contact terminals to be connected to antennal terminals formed on the IC chip.

7. A SIM comprising:

a substrate;

an IC chip mounted on the substrate;

a contact-terminal plate provided with a plurality of contact terminals; and

a SIM base holding the substrate, the IC chip and the contact-terminal plate;

wherein the SIM base is provided with a SIM antenna coil, and an antenna-terminal plate to be connected to the SIM antenna coil is formed on a surface of the substrate opposite a surface on which the contact-terminal plate is mounted.

8. The SIM according to claim 6 or 7, wherein

the IC chip includes a contact interface conforming to ISO 7816-2 and ISO 7816-3, a noncontact interface conforming to ISO 1443 and a USB contact interface.

9. The SIM according to claim 6, wherein

the extra contact terminals are a terminal CE1 disposed between terminals C1 and C5 among eight contact terminals C1 to C8, and a terminal CE2 disposed between the terminals C4 and C8.

10. The SIM according to claim 9, wherein

the antenna terminals of the IC chip are connected to the terminals CE1 and CE2 by wire bonding.

11. The SIM according to claim 9, wherein

the antenna terminals of the IC chip are connected to the terminals CE1 and CE2 via through holes.

12. The SIM according to claim 9, wherein

the terminals CE1 and CE2 are those to be connected to an antenna coil formed in a SIM holder.

13. The SIM according to claim 9, wherein

a pair of U-shaped circuits are formed so as to surround the IC chip on a surface of the substrate

opposite a surface of the substrate on which the contact-terminal plate is mounted, the terminals CE1 and CE2 are connected to the U-shaped circuits, respectively.

14. The SIM according to claim 13, wherein the U-shaped circuits are connected to the antenna terminals of the IC chip, respectively.

15. The SIM according to claim 13, wherein the terminals CE1 and CE2 are connected to the antenna terminals of the IC chip, respectively.

16. The SIM according to claim 6 or 7, wherein

the SIM has the shape of a thin plate having a thickness of 1.0 mm or below and a substantially rectangular shape not greater than 25 mm × 15 mm in a projection on a horizontal plane.

17. The SIM according to claim 6 or 7, wherein

one or some of a half-length photograph, a name and a number are printed on a surface of the SIM base opposite a surface of the SIM base on which the contact-terminal plate is mounted.

18. A SIM holder for detachably holding a SIM, said SIM holder comprising:

a case;

a terminal plate contained in the case and capable of being electrically connected to a contact-terminal plate included in the SIM; and

an antenna coil formed in the case;

wherein terminals to be connected to the antenna coil among those formed on the terminal plate are those to be connected to contact terminals, not used for contact communication, of the SIM.

19. The SIM holder according to claim 18, wherein

the antenna coil is formed on an inner surface of the case along the peripheral edges of the SIM held in the case.

20. The SIM holder according to claim 18, wherein

the antenna coil is formed in the case around the

terminal plate along the peripheral edges of the SIM held in the case.

21. The SIM holder according to claim 18, wherein a part of the case is formed of a transparent resin, through which one or some of a half-length photograph, a name and a number printed on a surface of the SIM held in the case can be viewed.

22. The SM holder according to claim 18, wherein

the case has a thickness of 1.0 mm or below and a rectangular shape not greater than 25 mm × 15 mm in a projection on a horizontal plane.

23. The SIM holder according to claim 18 further comprising:

a converter IC chip placed in the case and capable of converting an ISO 7816 interface into a USB interface; and

a USB connector placed on the case;

wherein the SIM held in the case is connected to the antenna coil for noncontact communication with an external device, the converter IC chip connected to the SIM converts the ISO 7816 interface into the USB interface to enable communication with the external device through the USB interface when the SIM holder is connected through the USB connector to the external device.

24. The SIM holder according to claim 23, wherein

the SIM held in the case includes an IC chip provided with a dual interface for contact and noncontact communication, and a SIM antenna coil connected to the IC chip.

25. The SIM holder according to claim 23, wherein

the antenna coil is formed on an inner surface of the case so as to extend along the peripheral edges of the SIM held in the case.

26. The SIM holder according to claim 23, wherein

the antenna coil is formed in the case around the

terminal plate along the peripheral edges of the SIM held in the case.

27. The SIM holder according to claim 23, wherein

at least a part of the case is formed of a transparent resin, through which one or some of a half-length photograph, a name and a number printed on a surface of the SIM held in the case can be viewed.

28. A SIM holder for detachably holding a SIM, said SIM holder comprising:

a case;

a terminal plate contained in the case and capable of being electrically connected to a contact-terminal plate included in the SIM; and

an antenna coil formed in the case;

wherein terminals of the terminal plate connected to the antenna coil, are connected to extra contact terminals on the SIM.

29. The SIM holder according to claim 28, further comprising: a USB connector placed on the case,

wherein the SIM holder is for holding a three-way SIM, and terminals CEH1, CEH2 of the terminal plate corresponding to terminals CE1 and CE2 of the three-way SIM are connected to the antenna coil.

30. The SIM holder according to claim 29, wherein

the SIM held in the case is provided with an IC chip provided with contact, noncontact and USB contact interfaces, and a SIM antenna coil connected to the IC chip.

31. The SIM holder according to claim 28, wherein

the antenna coil is formed on an inner surface of the case along the peripheral edges of the SIM held in the case.

32. The SIM holder according to claim 28, wherein

the antenna coil is formed in the case around the terminal plate substantially along the peripheral edges of the SIM held in the case.

33. The SIM holder according to claim 28, wherein

at least a part of the case is formed of a transparent resin, through which one or some of a half-length photograph, a name and a number printed on a surface of the SIM held in the case can be viewed.

34. The SIM holder according to claim 28, wherein

terminals CEH1 and CEH2 on the terminal plate corresponding to terminals CE1 and CE2 of the SIM are connected to the antenna coils.

35. An IC module comprising:

a substrate;

an IC chip mounted on the substrate; and

a contact-terminal plate having a plurality of contact terminals and mounted on the substrate;

wherein the plurality of contact terminals of the contact-terminal plate include extra contact terminals connected to antenna terminals of the IC chip.

36. The IC module according to claim 35, wherein

IC chip has a contact interface conforming to ISO 7816-2 and ISO 7816-3, a noncontact interface conforming to ISO 1443 and a USB contact interface.

37. The IC module according to claim 35, wherein

the extra contact terminals are a terminal CE1 disposed between terminals C1 and C5 among eight contact terminals C1 to C8, and a terminal CE2 disposed between the terminals C4 and C8.

38. The IC module according to claim 37, wherein

the antenna terminals of the IC chip are connected to the terminals CE1 and CE2 by wire bonding.

39. The IC module according to claim 37, wherein

the antenna terminals of the IC chip are connected to the terminals CE1 and CE2 via through holes.

40. The IC module according to claim 37, wherein the terminals CE1 and CE2 are those to be connected to an antenna coil formed in a SIM holder or in an IC card holder.

41. The IC module according to claim 37, wherein

a pair of U-shaped circuits are formed so as to surround the IC chip on a surface of the substrate opposite a surface of the substrate on which the contact-terminal plate is mounted, the terminals CE1 and CE2 are connected to the U-shaped circuits, respectively, and the U-shaped circuits are connected to the antenna terminals of the IC chip, respectively.

42. The IC module according to claim 41, wherein

the U-shaped circuits are connected to the antenna terminals of the IC chip, respectively.

43. The IC module according to claim 41, wherein

the terminals CE1 and CE2 are connected to the antenna terminals of the IC chip, respectively.

44. An IC module comprising:

a substrate;

an IC chip mounted on the substrate; and

a contact-terminal plate provided with a plurality of contact terminals and mounted on the substrate;

wherein a pair of U-shaped circuits are formed so as to surround the IC chip on a surface of the substrate opposite a surface of the substrate on which the contact-terminal plate is mounted, and the U-shaped circuits are connected to antenna terminals of the IC chip, respectively.

45. The IC module according to claim 44, wherein

the U-shaped circuits are connected to an antenna coil formed in a card.

46. The IC module according to claim 44, wherein

the U-shaped circuits are connected to the contact terminals, not used for contact communication, among the plurality of contact terminals.

47. The IC module according to claim 46, wherein

the U-shaped circuits are connected to terminals C4 and C8 among eight contact terminals C1 to C8.

48. The IC module according to claim 47, wherein

the U-shaped circuits are connected to the terminals C4 and C8 via through holes.

49. The IC module according to claim 44, wherein

the U-shaped circuits are connected to antenna terminals of the IC chip by wire bonding.

50. The IC module according to claim 44, wherein

the U-shaped circuits are connected to extra contact terminals included in the plurality of contact terminals.

51. The IC module according to claim 50, wherein

the U-shaped circuits are connected to the extra contact terminals via through holes, respectively.

52. The IC module according to claim 50, wherein

the U-shaped circuits are connected to antenna terminals of the IC chip by wire bonding.

53. The IC module according to claim 50, wherein

the extra contact terminals are connected to an antenna coil formed on a SIM holder or an IC card holder.

54. An IC module comprising:

a substrate;

an IC chip mounted on the substrate, and provided with contact and noncontact interfaces; and

a contact-terminal plate provided with a plurality of contact terminals and mounted on the substrate;

wherein an antenna-terminal plate to be connected to an antenna formed on a card is mounted on a surface of the substrate opposite a surface of the substrate on which the contact-terminal plate is mounted, the antenna-terminal plate is connected to the contact terminals, not used for contact communication, among the plurality of contact terminals by wires, and the antenna terminals of the IC are connected to the contact terminals not used for contact communication or to the antenna-terminal plate by wires.

55. The IC module according to claim 54, wherein

contact terminals C4 and C8 among the eight

terminals C1 to C8 are those not used for contact communication.

56. An IC card comprising:

a substrate;

an IC chip mounted on the substrate;

a contact-terminal plate provided with a plurality of contact terminals and mounted on the substrate; and

a card holding the substrate, the IC chip and the contact-terminal plate;

wherein the plurality of contact terminals of the contact-terminal plate include extra contact terminals connected to antenna terminals of the IC chip.

57. An Ic card comprising:

a substrate;

an IC chip mounted on the substrate;

a contact-terminal plate provided with a plurality of contact terminals and mounted on the substrate; and

a card holding the substrate, the IC chip and the contact-terminal plate;

wherein the card is provided with an antenna coil, and an antenna-terminal plate to be connected to the antenna coil is attached to a surface of the substrate opposite a surface on which the contact-terminal plate is mounted.

58. The IC card according to claim 56 or 57, wherein

the IC chip includes a contact interface conforming to ISO 7816-2 and ISO 7816-3, a noncontact interface conforming to ISO 1443 and a USB contact interface.

59. The IC card according to claim 57, wherein

the extra contact terminals are a terminal CE1 disposed between terminals C1 and C5 among eight contact terminals C1 to C8, and a terminal CE2 disposed between the terminals C4 and C8.

60 The IC card according to claim 59, wherein

the antenna terminals of the IC chip are connected

to the terminals CE1 and CE2 by wire bonding.

61. The IC card according to claim 59, wherein

the antenna terminals of the IC chip are connected to the terminals CE1 and CE2 via through holes.

62. The IC card according to claim 59, wherein

the terminals CE1 and CE2 are connected to an antenna coil formed in an IC card holder.

63. The IC card according to claim 59, wherein

a pair of U-shaped circuits are formed so as to surround the IC chip on a surface of the substrate opposite a surface of the substrate on which the contact-terminal plate is mounted, the terminals CE1 and CE2 are connected to the U-shaped circuits, respectively.

64. The IC card according to claim 63, wherein

the U-shaped circuits are connected to the antenna terminals of the IC chip, respectively.

65. An IC card holder for detachably holding an IC card, said IC card holder comprising:

a case;

a terminal plate contained in the case and capable of being electrically connected to a contact-terminal plate included in the IC card; and

an antenna coil formed in the case;

wherein terminals of the terminal plate connected to the antenna coil are connected to extra contact terminals formed on the IC card.

66. The IC card holder according to claim 65, further comprising: a USB connector placed on the case,

wherein the IC card holder is for holding a three-way IC card, and terminals CEH1, CEH2 of the terminal plate corresponding to terminals CE1 and CE2 of the three-way IC card are connected to the antenna coil.

67. The IC card holder according to claim 66, wherein

the IC card has an IC chip provided with contact, noncontact and USB contact interfaces, and an antenna

coil connected to the IC chip.